

CONCRETE 101

Concrete. We drive on it, walk on it, and it provides the foundations for where we live and work. However, for most people, it is a product that few think about until they choose to add it to their property or replace some existing.

In its simplest form, concrete is a mixture of powder called "Portland Cement", sand, rock and water. When mixed, the "Portland Cement" reacts chemically with water through a process called hydration, causing the mix to harden. Various additives can be included in the mix to improve strength, durability and workability.

Your local concrete supplier has engineered mix designs to meet every application. The mix designs are typically categorized by compressive strength (PSI). In our northern climate, all exterior concrete mixes must include air entrainment, to allow space for water to expand during freeze/thaw cycles.

It is important to note, the American Concrete Institute Standard 318 states, "Concrete exposed to freezing-and-thawing and in continuous contact with moisture and exposed to deicing chemicals (F3 exposure class) shall be placed at a minimum of 4,500 PSI."

Choosing the right mix for your project is just as critical as choosing the right contractor for the job. Do your homework. Ask to see a contractor's license; if they are bonded; for references and/or inspect prior work. Further, ask if the contractor is ACI - Flatwork Finisher Certified. This will all help ensure the placement of your new concrete surface is done professionally and with proper base preparation, placement and finishing, and curing techniques. Application of a curing compound during placement helps to prevent moisture loss and regulate temperature while the curing process takes place.

After a project is complete, please see the ongoing care and maintenance that is required for your concrete to outperform its design expectations.

SEAL YOUR CONCRETE

There is a common misconception that concrete is a maintenance-free product. However, in our northern climate, which is subjected to several freeze/thaw cycles per winter, the application of a penetrating concrete sealer is a great measure to protect your investment.

Concrete sealers are designed to provide a barrier against water and deicing agents. This will help extend the service life of your concrete pavement.

- Once freshly placed concrete has cured for 28 days, a concrete sealer can be applied, as long as weather conditions allow.
- Look for professional-grade, concrete sealers that are either Silane and/or Siloxane based products. If unsure, ask at your local contractor supply store, who specialize in concrete construction.
- Reapply every 2-4 years, or as recommended by the manufacturer. You can spot check your concrete by pouring water on it. If the water is absorbed, the concrete will darken, and you will need to reapply. If the water beads up and sheds off the surface, your sealer is working.

Applying a concrete sealer can be performed as a Do-It-Yourself project and generally can be completed in a few hours, depending on the size of your pavement. Sealers can either be sprayed or rolled on your concrete. Or you can also choose to ask your contractor for a quote on sealing your pavement

IT IS IMPORTANT TO NOTE MOST SURFACE DEFECTS CAUSED BY SALTS AND DEICING AGENTS ARE AESTHETIC IN NATURE AND NOT STRUCTURAL. A FEW EASY STEPS CAN HELP MITIGATE POTENTIAL ISSUES.

AVOID DEICING AGENTS

Concrete can be vulnerable to damage when exposed to salts and other deicing agents.

It is recommended that you avoid using any type of deicer on your concrete. Make sure to read the labels of products sold that claim to be "concrete friendly." If the ingredient list shows magnesium chloride or potassium acetate, do not use. Homemade vinegar deicing sprays, prevalent on the internet, are not good for concrete as vinegar is an acid. Also avoid using fertilizer as deicers as it too contains substances that can chemically attack concrete.

YOUR BEST AND SAFEST BET IS TO UTILIZE PLAIN SAND FOR TRACTION.

Minimize parking of vehicles on driveways when possible as salts and deicing chemicals will drip onto the pavement. Products applied to public roadways by local and state government agencies will eventually dry but will reactivate when moisture occurs again. The same goes for materials applied on public and private parking lots. Repeated freeze/thaw cycles will inflict damage to the surface layer of concrete if left exposed to salts and deicers.



KEYS TO CONCRETE LONGEVITY

- Utilize Proper Concrete Mix Design.
- Select Qualified Contractor.
- Ensure Proper Placement and Finishing Techniques, including Application of Curing Compound.
- Seal the Concrete Surface; Reapply as recommended.
- Avoid Deicing Agents.

SEALING CONCRETE 101



Ready Mix & Concrete
Products Assoc.

There is a misconception concrete is maintenance-free. In our northern climate, which is subjected to many freeze/thaw cycles per winter, the application of a penetrating concrete sealer is a great measure to protect your investment. Concrete sealers are designed to provide a barrier against water and deicing agents. This will help preserve the aesthetics and extend the service life of your concrete pavement.

- Once freshly placed concrete has cured for 28 days, a concrete sealer can be applied, as long as weather conditions allow.
- Use professional-grade, concrete sealers that are **Silane** and/or **Siloxane** based products. If unsure, ask at your local contractor supply store that specialize in concrete construction.

Applying a concrete sealer can be performed as a Do-It-Yourself project and generally can be completed in a few hours, depending on the size of your pavement. Sealers can either be sprayed or rolled onto your concrete. Or you can ask your contractor for a quote on sealing your pavement.



Tools Needed

Concrete sealers can be applied by industrial sprayer or rolled-on brush application.

- Silane or Siloxane based sealer
- Industrial, hand-pump sprayer or
- Light nap/form paint roller
- Adjustable handle
- Paint tray (liner optional)
- Safety glasses and gloves



Surface Preparation

24 hours prior to sealing, clean the concrete surface. Be sure to use a cleaner/degreasing agent for any oil or chemical stains. Let concrete surface dry.

Prior to sealer application, sweep concrete surface to ensure it is clear of any debris. Set a barrier to block concrete from traffic.

Application of Sealer

- Pour sealer into paint tray for rolled-on application.
- Roll sealer onto concrete pavement in even strokes.
- Concrete will darken when sealer is applied. Look for light spots and reapply as necessary.
- Seal sections of your driveway by using the joint lines as your guide.
- Let cure until dry.

Reapplication

Reapply every 2-4 years, or as recommended by the manufacturer. Test concrete by splashing water on it; if the water beads up, the sealer is still effective.

HELPFUL HINTS



- Measure pavement surface area to determine square footage. Then purchase sealer.
- Direct sunlight and hot temperatures can cause sealer to blister; seal concrete in cool, dry conditions – early morning vs. mid-to-late afternoon.
- Use a light nap or foam roller.
- When cured, walk to look for light spots and reapply sealer to unsealed areas. Use a small foam brush for touch-ups.
- Utilize the concrete joints and “color” in the sections before moving on.

CAULKING CONCRETE 101



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Expansion joints and saw cuts in concrete slabs allow concrete to expand and contract with temperature changes without cracking the slab. These joints and cuts must be sealed to prevent water intrusion under the slab, which can deteriorate the base supporting the slab. Sealing your concrete joints with a professional-grade, polyurethane-based, non-sag caulk will minimize the risk of heaving/settling during freeze/thaw weather conditions.

Caulking your joints can be performed as a Do-It-Yourself project and generally can be completed in a few hours with the right tools, materials and surface preparation. Or you can ask your contractor for a quote on caulking your pavement.



Items Needed

- Low-modulus, polyurethane-based, non-sag sealant
- Backer Rod (for joints ¼" or larger)
- Caulking Gun
- Utility Knife
- Putty Knife
- Painter's Tape (optional)
- Safety glasses and gloves

Surface Preparation

- Sweep joints to remove any pebbles, dirt or loose debris.
- Remove any affixed materials with a utility knife or stiff-bristle brush.
- Ensure area to be caulked is dry and free of any chemicals/materials that will restrict a proper bond.
- Insert backer rod between 1/8th and 1/2" into the concrete joint. Backer rod helps to keep the caulking in place and minimizes the amount needed.
- Apply painter's tape along joint lines to ensure uniform coverage (optional).

Application of Caulking

- Cut the tip of the nozzle with a utility knife and insert the tube into a standard caulk gun. Make sure to match the cut on the nozzle to the width of the joint.
- Move the nozzle slowly along the length of the joint, pressing the caulking into the joint.
- Use the tip of the nozzle or your finger to smooth the sealant as needed.
- Ensure proper coverage/bonding when changing directions where joints intersect.
- Allow caulking to cure (harden) before opening area to traffic.

Reapplication

- If installed correctly, professional-grade caulking materials should last 7-10 years.
- If you notice caulking starting to come out of the joints, carefully cut the loose sections out and reapply new caulking, using the method described above.

HELPFUL HINTS



- Measure the total length of joints and saw cuts to be filled, prior to purchasing caulking and backer rod. Your local contractor supply store can assist you in estimating the amount of caulking you will need per LF.
- Have rags and an empty container to available to store the tube and caulking gun when done or changing directions.
- Immediately clean up any excess caulking with a solvent or citrus-based cleaning agent.

- If you use self-leveling caulking, the material is very fluid. The material will flow from the tube freely. To end the flow of self-leveling caulking, quit squeezing the handle of the caulking gun approximately one foot before you want to stop.

RANDOM CRACKS

Random cracks in concrete can be caulked utilizing the methods described above. Be sure to measure the crack width and length so that backer rod and caulking materials can be purchased and sized accordingly.